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PATENT & TRADEMARK OFFICE

PATENT 4F/A 2874

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	)	
ROBERT J. SCHREODER	)	
Serial No: 09/892,144	)	Group Art Unit: 2874
Filed: June 26, 2001	)	Examiner: VALENCIA, D.E.
For: FIBER OPTIC SUPPORTED SENSOR TELEMETRY SYSTEM	)	Docket No: 60.1413

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Ruth A. Schreiber 5/30/03
Date

TRANSMITTAL OF APPEAL BRIEF

Mail Stop Appeal Brief – Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Applicant transmits in triplicate the Appeal Brief in this application with respect to the Notice of Appeal filed on April 1, 2003.

Pursuant to 37 CFR 1.17(c) the fee for filing the Appeal Brief is $320.00.

The Commissioner is authorized to charge $320.00 to Deposit Account Nº 19-0615. In the event that this amount is incorrect, the Commissioner is authorized to credit/further charge Deposit Account Nº 19-0615. Two copies of this request are attached.

Respectfully submitted,

By: WBBatzer
William B. Batzer
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#9/Appeal Brief
6/9/03
O. P.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

ROBERT J. SCHROEDER

Serial N°: 09/892,144

Filed: June 26, 2001

For: FIBER OPTIC SUPPORTED SENSOR TELEMETRY SYSTEM

Group Art Unit: 2874

Examiner: VALENCIA, D.E.

Docket N°: 60.1413

APPEAL BRIEF

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231 on 5/30/03.

Ruth A. Schreiber
Signature

Ruth A. Schreiber
Name Printed

Mail Stop Appeal Brief – Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Appellant hereby submits this Appeal Brief for United States Patent Application Serial No. 09/892,144, filed June 26, 2001.

I. Real Party-in-Interest

The real party-in-interest, and owner of all domestic rights in the instant invention, is Schlumberger Technology Corporation, a Texas Corporation with offices, inter alia, in Ridgefield, Connecticut as evidence by the assignment recorded with the United States Patent and Trademark Office at reel 011955/frame 0604.

II. Related Appeals or Interferences

Appellants are unaware of any pending appeals or interferences whose outcomes could directly affect, or be affected by, the disposition of the instant appeal.

III. Status of the Claims

Claims 1-27 are pending and stand rejected under 35 U.S.C. § 102(b). The Appellants appeal the § 102(b) rejection of claims 1-27.

IV. Status of the Amendments

Claims 1-27 have not been amended during prosecution.

V. Summary of the Invention

Briefly, the present invention relates to a sensor-telemetry system wherein an optical fiber provides telemetry signals outputted by both optical and non-optical sensors. The sensor-telemetry system operates to support multiple sensors by coupling a first optical signal and a second optical signal onto the fiber. The first optical signal is outputted from the optical sensor while the second optical signal derives from the non-optical sensor. The first and second optical signals are transmitted over the optical fiber to a remote location where the first and second optical signals are demodulated from the optical fiber.

VI. Issue

Whether the Examiner erred in rejecting claims 1-27 under 35 U.S.C. § 102(b) as being anticipated by Weis's US Patent No. 5,808,779 ("the Weis reference") on the alleged basis that "although Weis does not explicitly state that the Bragg gratings optically sense the external conditions themselves without the aid of another device, the optical gratings

intrinsically embedded in fiber inherently function as optical sensor [sic] to sense the external conditions" (see February 4, 2003 Office Action, at 2, ¶ 3), when the fiber optic sensors of the present invention have been developed to directly measure a number of environmental effects (see specification, at 1) while the fiber Bragg gratings of Weis do not directly measure environmental effects?

VII. Grouping of the Claims

Claims 1, 12, and 20 are independent. Because all of these independent claims have both optical and non-optical sensors, which is central to the issue presented herein, it appears that all of the claims should stand and fall together.

VIII. Arguments

As noted above, the present invention teaches and claims a sensor-telemetry system having both optical sensor(s) and non-optical sensor(s) and/or the signals therefrom. Independent claims 1, 12 and 20 are reproduced below, emphasis added:

1. A sensor-telemetry system comprising:
   at least one **optical sensor**;
   at least one **non-optical sensor**;
   an optical fiber coupled with the optical sensor and the non-optical sensor and being arranged to carry signals outputted from the optical sensor and the non-optical sensor.

12. An oilfield monitoring system comprising:
   a optical fiber deployed in an oilfield;
   a plurality of **optical sensors** coupled with the optical fiber;
   a plurality of **non-optical sensors**;
   at least one converter coupling at least one of the plurality of non-optical sensors with the optical fiber, wherein the pluralities of optical and non-optical sensors are deployed throughout the oilfield.

20. A method of supporting multiple sensors on a optical fiber comprising:
a) coupling a first optical signal onto the optical fiber, the first optical signal being outputted from **an optical sensor**;
b) coupling a second optical signal onto the optical fiber, the second optical signal being derived from **a non-optical sensor**;
c) transmitting the first and second optical signals over the optical fiber to a location remote from the fiber optic and non-fiber optic sensors; and
d) demodulating the first optical signal and the second optical signal at the location.

As will be discussed below, the prior art reference cited by the Examiner does not disclose the use of both optical and non-optical sensors or the use of an optical fiber to carry signals output from both of these types of sensors. Accordingly, the Examiner's final rejection of claims 1-27 should be **reversed**.

The Examiner relies on the Weis reference to assert a 35 U.S.C. § 102(b) anticipation rejection of the presently pending claims. 35 U.S.C. § 102 states, in pertinent part:

> A person shall be entitled to a patent unless:
> ...
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or sale in this country, more than one year prior to the date of application for patent in the United States;
> ...

As discussed at MPEP 706.02 et seq. anticipation rejections under § 102 require that the cited reference teach each and every element of the claimed invention either implicitly or impliedly. While features not explicitly taught may be supported by inherent reference to the claimed feature, an anticipation rejection still requires that each and every claimed feature be disclosed. In this case, the Examiner's reliance on the Weis reference is misplaced as the Weis reference does not disclose each and every element of the rejected claims. To support his rejection of the claims, the Examiner has mischaracterized an element in Weis by stating that the element has "inherent" attributes that are actually contradictory to the teaching of the

Weis reference. In particular, the Weis reference does not disclose the use of both optical and non-optical sensors.

The final Office Action dated February 4, 2003 contains the following description of the Weis reference at the bottom of page 2 and the top of page 3: "...Weis discloses an oilfield monitoring system comprising: a optical fiber (ref 20) deployed in an oilfield; a plurality of optical sensors coupled with the optical fiber (ref 330, 340, 350, 360); a plurality of non-optical sensors (ref 331, 341, 351, 361, ...); and at least one converter ... Although Weis does not explicitly state that the Bragg gratings optically sense the external conditions themselves without the aid of another device, the optical gratings intrinsically embedded in fiber inherently function as optical sensors the sense the external conditions." Appellant disagrees with this characterization of the Weis reference and believes that the difference between an "optical sensor," as this phrase is used in the present application, and a fiber Bragg grating element, such as those described in the Weis reference has not been appreciated.

As noted on page 1, lines 15-17, of the present application: "Fiber optic sensors have been developed to **measure** a number of **environmental effects**, such as position (linear, rotational), fluid level, temperature, pressure, strain, pH, chemical composition, etc. ..." (emphasis added) (see also page 5). Furthermore, the non-optical sensors described at page 6 of the present application also sense external environmental effects such as pressure and temperature, independent from the optical sensors. Accordingly, as claimed in claims 1, 12, and 20, the present invention includes two sets of sensors, optical and non-optical, which independently detect external environmental effects.

By contrast, Weis discloses a plurality of sensor systems, wherein each system includes an optical 330 component and a non-optical 331 component, to detect and transmit a single external condition. As noted in column 6, lines 46-59 of Weis, the condition sensed by

one component is the input for the other component: "The response from any type of sensor (e.g. nuclear, electromagnetic, acoustic, pressure, temperature, torque, strain, etc.) is converted to an electrical signal which is applied to the piezoelectric crystal. ... This electrical output, when applied to the piezoelectrical crystal, deforms or perturbs the affixed Bragg grating." The fiber Bragg gratings shown in Weis are not sensors as defined by the present invention because they are not configured to measure environmental effects. The Weis fiber Bragg gratings are part of an electro-optical data telemetry system that allows an electrical signal generated by a non-optical sensor that responds to a physical parameter of interest to be transmitted to the surface. Accordingly, while each sensor system may have optical and non-optical components, there is no teaching or suggestion in the Weis reference to utilize separate optical and non-optical sensors as defined and claimed in the present patent application.

In fact, the configuration disclosed in Weis does not allow for the fiber Bragg grating to operate as a sensor of environmental effects. As noted in column 10, lines 37-39, of Weis: "... the PZ crystal component 28 of the grating-PZ element 70 is affixed to the grating 38 by means of an adhesive or other suitable bonding material." The gratings in Weis do not and can not act as intrinsic or extrinsic optical sensors that measure environmental effects. To properly perform their function, as described in the Weis reference, the gratings must be isolated from the local environment, such as by bonding the PZ crystal to the grating with an adhesive. Accordingly, because the Bragg gratings of Weis do not sense an environmental response independent of the non-optical sensor, they do not "inherently function as an optical sensor" and do not themselves "sense external conditions" or output signals distinct from the signals output from the non-optical sensors as asserted by the Examiner. Therefore, Weis does not teach a telemetry system having an optical sensor and a non-optical sensor.

Appellant has disclosed and claimed a sensor-telemetry system that includes at least one optical sensor, at least one non-optical sensor, and an optical fiber coupled with the optical sensor and the non-optical sensor and arranged to carry signals outputted from the optical sensor and the non-optical sensor. This concept is not disclosed or suggested by the Weis reference. The Bragg gratings in Weis are not optical sensors and the optical fiber in Weis does not carry different signals, some output from Bragg gratings 330, 340, 350, and 360 and others output from non-optical sensors 331, 341, 351, and 361. The Examiner has attempted to separate a single sensor into two sensors and has failed to support a 35 U.S.C. § 102(b) anticipation rejection. Accordingly, a proper prima facie showing of anticipation has simply not been made by the Examiner as each and every element of the present invention is not taught by the Weis reference.

Appellant respectfully request that the Examiners final rejection of claims 1-27 be **reversed**.

In the event that a fee is due in connection with this Appeal Brief, the Commissioner is hereby authorized to charge any underpayment to Deposit Account No. 19-0615.

Respectfully submitted,

By: ____________________
William B. Batzer
Reg. No. 37,088

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Dated: 30 May 2003

Appendix

CLAIMS ON APPEAL

1. A sensor-telemetry system comprising:

   at least one optical sensor;

   at least one non-optical sensor;

   an optical fiber coupled with the optical sensor and the non-optical sensor and being arranged to carry signals outputted from the optical sensor and the non-optical sensor.

2. The system of claim 1, wherein the optical sensor comprises an intrinsic fiber optic sensor.

3. The system of claim 2, wherein the intrinsic fiber optic sensor comprises a fiber Bragg grating.

4. The system of claim 1, wherein the optical sensor comprises one of the following: a position sensor, a chemical sensor, a pH sensor, a pressure sensor, a temperature sensor, a strain sensor, a refractive index sensor, an acoustic sensor, and a magnetic field sensor.

5. The system of claim 1, wherein the non-optical sensor comprises one of the following: a flow sensor, pressure gauge, a temperature gauge, a geophone, an induction sensor, a current electrode, an acoustic sensor, a micro-electromechanical sensor, and a micro-optoelectromechanical sensor.

6. The system of claim 1, further comprising a converter coupling the non-optical sensor with the optical fiber.

7. The system of claim 6, wherein the converter comprises an electro-optic device.

8. The system of claim 6, wherein the converter comprises a fiber Bragg grating at least partially encircled by a coating that converts a non-optical signal into a strain on the fiber Bragg grating.

9. The system of claim 1, further comprising a detector coupled with the optical fiber.

10. The system of claim 9, wherein the detector comprises an opto-electronic device.

11. The system of claim 1, further comprising a light source optically coupled with the optical fiber.

12. An oilfield monitoring system comprising:

a optical fiber deployed in an oilfield;

a plurality of optical sensors coupled with the optical fiber;

a plurality of non-optical sensors;

at least one converter coupling at least one of the plurality of non-optical sensors with the optical fiber, wherein the pluralities of optical and non-optical sensors are deployed throughout the oilfield.

13. The system of claim 12, wherein the optical fiber is deployed in a borehole that traverses the oilfield.

14. The system of claim 12, wherein at least one of the plurality of non-optical sensors is positioned remotely from the optical fiber.

15. The system of claim 14, wherein the non-optical sensor positioned remotely from the optical fiber outputs a non-optical signal that travels through the oilfield and is detected by the converter and converted to an optical signal that is coupled to the optical fiber.

16. The system of claim 15, wherein the converter comprises a fiber Bragg grating at least partially encircled by a coating that converts the non-optical signal to a strain on the fiber Bragg grating.

17. The system of claim 12, wherein the converter comprises an electro-optic device.

18. The system of claim 12, further comprising:

at least one light source coupled with the optical fiber, the light source outputting light that is carried by the optical fiber to at least one of the plurality of optical sensors; and

at least one detector coupled with the optical fiber, the detector detecting a signal carried by the fiber optic from at least one of the pluralities of optical and non-optical sensors.

19. The systems of claim 18, wherein the light source and the detector reside at the surface of the oilfield.

20. A method of supporting multiple sensors on a optical fiber comprising:

a) coupling a first optical signal onto the optical fiber, the first optical signal being outputted from an optical sensor;

b) coupling a second optical signal onto the optical fiber, the second optical signal being derived from a non-optical sensor;

c) transmitting the first and second optical signals over the optical fiber to a location remote from the fiber optic and non-fiber optic sensors; and

d) demodulating the first optical signal and the second optical signal at the location.

21. The method of claim 20, wherein the first and the second optical signals are wavelength division multiplexed onto the optical fiber.

22. The method of claim 20, wherein the first and the second optical signals are frequency division multiplexed onto the optical fiber.

23. The method of claim 20, wherein the first and the second optical signals are time division multiplexed onto the optical fiber.

24. The method of claim 20, wherein the non-fiber optical sensor outputs a non-optical signal that is converted into the second optical signal.

25. The method of claim 20, further comprising:

transmitting a first wavelength of light through the optical fiber; and

inputting the first wavelength of light to the optical sensor, wherein the optical sensor modifies the first wavelength of light to produce the first optical signal.

26. The method of claim 20, wherein the first optical signal is one of a first plurality of optical signals from a plurality of optical sensors, and the second optical signal is one of a second plurality of optical signals from a plurality of non-optical sensors.

27. The method of claim 26, further comprising:

transmitting a plurality of wavelengths of light through the optical fiber; and

inputting the plurality of wavelengths of light to the plurality of optical sensors, wherein each optical sensor modifies one of the plurality of wavelengths of light to produce one of the first plurality of optical signals.